

Interdisciplinary International Journal of Advances in Social Sciences, Arts and Humanities (IJJASSAH)

INTERDISCIPLINARY INTERNATIONAL JOURNAL OF ADVANCES IN SOCIAL SCIENCES, ARTS AND HUMANITIES (IJJASSAH)

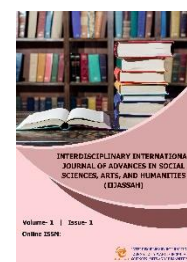


Volume 1 Issue 1



<https://ejournal.svgacademy.org/index.php/ijjassah/index>

Original Article



<https://doi.org/10.62674/ijjassah.2024.v1i1.001>

Published Date: 01-10-2024

PP: 1-11

CORRUPTION VS HUMAN DEVELOPMENT: AN EMPIRICAL ANALYSIS

Deblina Sarkar

Maharaja Manindra Chandra College, Kolkata, India

Corresponding Author's Email: deblinasarkar0623@gmail.com

ABSTRACT

Background: Corruption is a significant issue facing the modern world. Corruption hinders social, political, economic, and environmental growth, causing inequality and a decrease in public spending. Research demonstrates that corruption adversely affects human capital improvement, ecological sustainability, and political frameworks, hindering progress at both high and low levels. **Method:** This paper examines the relationship between corruption and human development and how each influences the other, using 2018 data from 100 countries. This study uses a linear regression model and statistical methods like goodness of fit, hypothesis testing, and correlation coefficients to look into how the Corruption Perception Index (CPI) and the Human Development Index (HDI) affect each other. **Result:** The corruption perception index (CPI) and the human development index (HDI) have an important positive correlation (0.7708). Models explain 62.08% of HDI variation and 57.28% of CPI variation, depending on regression analysis. This implies that higher CPI (less corruption) notably enhances HDI (human development), and vice versa. **Discussion:** Findings show a strong correlation between higher human development (higher HDI) and lesser corruption (higher CPI), which has a major impact on social and economic circumstances. Though several countries have progressed with decreasing corruption, perceptions across the world remain unchanged, and numerous fields are still experiencing difficulties. **Conclusion:** This study's findings demonstrate a significant inverse relationship between corruption and human development. With the goal of fighting corruption and enhancing human development, it emphasizes the importance of a wide range of indicators, including technical developments, institutional reforms, and international cooperation.

Keywords: Corruption; Human Development; CPI; HDI; Growth; Education; Policy

INTRODUCTION

Improvement in human well-being has been facing various hindrances over the time. While some are natural, artificial, or man-made. Corruption is one of those such man-made hindrances. Many studies have been carried out till date to measure and explain how this corruption by a few is disintegrating the prospects for the rest of society. The Oxford English Dictionary describes corruption as “*dishonest or fraudulent conduct by those in power, typically involving bribery.*” According to Transparency International, corruption is “*the abuse of entrusted power for private gain*” (Montagna & Harris, 2019). Corrupt practices by the government have wide-reaching social, political, economic, and environmental impacts on society, leading to reduced investments in public goods, damaging market competition, and increasing inequality. The Human Development Index (HDI) is a statistic developed and

compiled by the United Nations to measure and various countries' levels of social and economic development. It consists of three main topics of interest: education, life expectancy, and gross national income per capita. By using this index, one may compare the development levels of various nations and trace changes in development over time. The ecological balance is harmed by the widespread use of priceless natural resources for personal benefit and for indiscriminate mining, logging, petroleum drilling, etc. many groups provide bribes.

The influence of corruption on the rise of human capital in developing nations shows that corruption in both direct and indirect ways hampers the growth of human capital, mainly through its impact on standard of living and knowledge ([Linhartova & Pucek, 2024](#)). Green growth and sustainable environments are seriously hampered by corruption, which has negative effects all over the countries and hinders the improvement of ecological outcomes in parallel with economic growth ([Tawiah, Zakari & Alvarado, 2023](#)). High as well as low levels of corruption restrict growth, whereas moderate levels may result in a positive effect. Optimal level of corruption at which its effects change from advantageous to disadvantageous ([Trabelsi, 2024](#)). To combat corruption, import and export operations also need to simplify, increase in income, standard of living, and enhance political systems, particularly democracy ([Audi & Ali, 2017](#)). In terms of government expenditures and per capita income, the perfect extent of monitoring is for preventing corruption. Due to budgetary constraints, supervisory input should be minimal at low-income levels but increases significantly with income. Since honest leaders are unable to totally eradicate others' dishonest acts, partial corruption persists in middle-class societies ([Zhang et al., 2023](#)). Corruption in the healthcare industry during COVID-19, stressing major issues such as medical supply fraud, worse service quality, and the demand for public participation in detecting corruption ([Ruzanov & Zharlygassinov, 2021](#)).

OBJECTIVE OF STUDY

This particular study investigates statistically the interaction of corruption and human development across 100 countries, attempting to explain both how corruption varies and how variations in human development vary.

- I. Find the correlation coefficient between HDI and CPI.
- II. Regress HDI on CPI using a linear regression model.
 - i. Test the hypothesis that the slope coefficient is equal to zero.
 - ii. Find the Goodness of Fit (r^2) of the model.
- III. Regress CPI on HDI using a linear regression model.
 - i. Test the hypothesis that the slope coefficient is equal to zero.
 - ii. Find the Goodness of Fit (r^2) of the model.

METHODOLOGY

Theoretical Background of Correlation Coefficient:

This study uses the tools of simple correlation and regression. Correlation means the association or interdependence between two random variables. If two variables are so related that a change in the magnitude of one of them is accompanied by a change in the magnitude of the other, they are said to be correlated. $r = \frac{\text{cov}(x, y)}{\sigma_x \sigma_y}$, Where σ_x and σ_y are the standard deviations of x and y respectively, and cov (x, y) denotes the covariance of x and y.

Theoretical Background of Hypothesis Testing

In order to reach decisions about population on the basis of sample observations drawn from the population, it is required to make certain assumptions or guesses about the population parameter. Such an assumption is called a statistical hypothesis, which may or may not be true, and the procedure is called testing of hypothesis or test of significance.

$Y_i = \alpha + \beta X_i + u_i$ where $i=1, 2, 3, \dots, n$ (For regression HDI on CPI, we denote $\alpha=\beta_1$ and $\beta=\beta_2$. Similarly, regression CPI on HDI, we denote $\alpha=\beta_3$ and $\beta=\beta_4$)

Where u_i represents the stochastic disturbance terms or random errors. The estimated regression equation be: $\hat{Y}_i = \hat{\alpha} + \hat{\beta} X_i$. Where $\hat{\alpha}$ and $\hat{\beta}$ are the estimates of the parameters α and β , respectively, and \hat{Y}_i is the estimated value of Y for any given value of $X=x_i$. It is not expected that all observations will fall on the estimated regression line. This implies the true value Y_i and the estimated value \hat{Y}_i will differ, and this difference is denoted by: $Y_i - \hat{\alpha} - \hat{\beta} X_i$ [e_i can be positive, negative or zero]. After estimating the values of α and β , the level of significance is calculated. For the purpose of the paper, we will concentrate on the significance test of β . Then constructed $H_0: \beta=0$ (null) and $H_1: \beta < 0$ (alternative) hypothesis.

Since σ_u^2 is not known, the above test static cannot be calculated numerically. s_u^2 may use in place of σ_u^2 . After that t-value is used where, $t = \frac{t}{\sqrt{\frac{x_i^2}{n}}}$. Next TSS, ESS, and RSS values are determined. H_0 will be rejected at 5% level of significance if the calculated value of $t < -t_{0.05, n-2}$

Goodness of fit of the regression equation

The coefficient of determination (r_{xy}^2) is commonly used to measure the goodness of fit of a regression line. It measures the proportion or percentage of the total variation in the regress and explained by the regression model.

$$r_{xy}^2 = \frac{ESS}{TSS}$$

RESULTS

This is a cross-section study, which is based on secondary data, includes data from the HDI and CPI for 100 countries in 2018. Corruption Perceptions Index (CPI), a well-known measure of perceived level of corruption published by Transparency International. It is measured on a scale of 0 to 100, where 0 is highly corrupt and 100 is incorrupt. The well-known measure of human development was first published by UNDP (United Nations Development Programme) in 1990. The value of HDI lies between 0 and 1, where 0 is low development and 1 is highest development.

The CPI data for the year 2018 has been collected from the Transparency International website. (<https://www.transparency.org/en/cpi/2018>) and the HDI data for the year 2018 has been collected from (Human Development Index - HDI 2018 | countryeconomy.com)

Table 1: HDI & CPI Data and Calculations for Correlation Coefficient and Regression

SN	Country	HDI (Y _i)	CPI (X _i)	X _i ²	Y _i ²	X _i Y _i	Ŷ _i	u _i	u _i ²	Ŷ _i	v _i	v _i ²
1	Afghanistan	0.496	16	256	0.246016	7.936	0.55654	-0.06054	0.003665092	22.7644	-6.7644	45.757107
2	Albania	0.791	36	1296	0.625681	28.476	0.67654	0.11446	0.013101092	52.0874	-16.0874	258.80444
3	Algeria	0.759	35	1225	0.576081	26.565	0.67054	0.08846	0.007825172	48.9066	-13.9066	193.39352
4	Argentina	0.83	40	1600	0.6889	33.2	0.70054	0.12946	0.016759892	55.964	-15.964	254.8493
5	Australia	0.938	77	5929	0.879844	72.226	0.92254	0.01546	0.000239012	66.6992	10.3008	106.10648
6	Austria	0.914	76	5779	0.835396	69.464	0.91654	-0.00254	0.00000645	64.3136	11.6864	136.57194
7	Bangladesh	0.614	26	676	0.376996	15.964	0.61654	-0.00254	0.00000645	34.4936	-8.4936	72.141241
8	Bhutan	0.617	68	4624	0.380689	41.956	0.86854	-0.25154	0.063272372	34.7918	33.2082	1102.7845

9	Brazil	0.761	35	1225	0.579121	26.635	0.67054	0.09046	0.008183012	49.1054	-14.1054	198.96231
10	Bulgaria	0.816	42	1764	0.665856	34.272	0.71254	0.10346	0.010703972	54.5724	-12.5724	158.06524
11	Canada	0.922	81	6561	0.850084	74.682	0.94654	-0.02454	0.000602212	65.1088	15.8912	252.53024
12	Chile	0.847	67	4489	0.717409	56.749	0.86254	-0.01554	0.000241492	57.6538	9.3462	87.351454
13	China	0.758	39	1521	0.574564	29.562	0.69454	0.06346	0.004027172	48.8072	-9.8072	96.181172
14	Colombia	0.761	36	1296	0.579121	27.396	0.67654	0.08446	0.007133492	49.1054	-13.1054	171.75151
15	Comoros	0.538	27	729	0.289444	14.526	0.62254	-0.08454	0.007147012	26.9392	0.0608	0.0036966
16	Costa Rica	0.794	56	3136	0.630436	44.464	0.79654	-0.00254	0.00000645	52.3856	3.6144	13.063887
17	Croatia	0.837	48	2304	0.700569	40.176	0.74854	0.08846	0.007825172	56.6598	-8.6598	74.992136
18	Cuba	0.778	47	2209	0.605284	36.566	0.74254	0.03546	0.001257412	50.7952	-3.7952	14.403543
19	Cyprus	0.873	59	3481	0.762129	51.507	0.81454	0.05846	0.003417572	60.2382	-1.2382	1.5331392
20	Denmark	0.93	88	7744	0.8649	81.84	0.98854	-0.05854	0.003426932	65.904	22.096	488.23322
21	Egypt	0.7	35	1225	0.49	24.5	0.67054	0.02946	0.000867892	43.042	-8.042	64.673764
22	Finland	0.925	85	7225	0.855625	78.625	0.97054	-0.04554	0.002073892	65.407	19.593	383.88565
23	France	0.891	72	5184	0.793881	64.152	0.89254	-0.00154	0.00000237	62.0274	9.9726	99.452751
24	Georgia	0.786	58	3364	0.617796	45.588	0.80854	-0.02254	0.000508052	51.5904	6.4096	41.082972
25	Germany	0.939	80	6400	0.881721	75.12	0.94054	-0.00154	0.00000237	66.7986	13.2014	174.27696
26	Ghana	0.596	41	1681	0.355216	24.436	0.70654	-0.11054	0.012219092	32.7044	8.2956	68.816979
27	Greece	0.872	45	2025	0.760384	39.24	0.73054	0.14146	0.020010932	60.1388	-15.1388	229.18327
28	Guyana	0.67	37	1367	0.4489	24.79	0.68254	-0.01254	0.000157252	40.06	-3.06	9.3636
29	Hong Kong	0.939	76	5776	0.881721	71.364	0.91654	0.02246	0.000504452	66.7986	9.2014	84.665762
30	Hungary	0.845	46	2116	0.714025	38.87	0.73654	0.10846	0.011763572	57.455	-11.455	131.21703
31	Iceland	0.938	76	5776	0.879844	71.288	0.91654	0.02146	0.000460532	66.6992	9.3008	86.504881
32	India	0.647	41	1681	0.418609	26.527	0.70654	-0.05954	0.003545012	37.7738	3.2262	10.408366
33	Indonesia	0.707	38	1444	0.499849	28.866	0.68854	0.01846	0.000340772	43.7378	-5.7378	32.922349
34	Iran	0.797	28	784	0.635209	22.316	0.62854	0.16846	0.028378772	52.6838	-24.6838	609.28998
35	Iraq	0.689	18	324	0.474721	12.402	0.56854	0.12046	0.014510612	41.9486	-23.9486	573.53544
36	Ireland	0.942	73	5329	0.887364	68.766	0.89854	0.04346	0.001888772	67.0968	5.9032	34.84777
37	Israel	0.906	61	3721	0.820836	55.266	0.82654	0.07946	0.006313892	63.5184	-2.5184	6.3423386
38	Italy	0.883	52	2704	0.779689	45.916	0.77254	0.11046	0.012201412	61.2322	-9.2322	85.233517
39	Japan	0.915	73	5329	0.837225	66.795	0.89854	0.01646	0.000270932	64.413	8.587	73.736569

40	Kenya	0.579	27	729	0.335241	15.633	0.62254	-0.04354	0.001895732	31.0146	-4.0146	16.117013
41	Kuwait	0.808	41	1681	0.652864	33.128	0.70654	0.10146	0.010294132	53.7772	-12.7772	163.25684
42	Lebanon	0.73	28	784	0.5329	20.44	0.62854	0.10146	0.010294132	46.024	-18.024	324.86458
43	Liberia	0.465	32	1024	0.216225	14.88	0.65254	-0.18754	0.035171252	19.683	12.317	151.70849
44	Madagascar	0.521	25	625	0.271441	13.025	0.61054	-0.08954	0.008017412	25.2494	-0.2494	0.0622004
45	Malaysia	0.804	47	2209	0.646416	37.788	0.74254	0.06146	0.003777332	53.3796	-6.3796	40.699296
46	Maldives	0.719	31	961	0.516961	22.289	0.64654	0.07246	0.005250452	44.9306	-13.9306	194.06162
47	Mali	0.427	32	1024	0.182329	13.664	0.65254	-0.22554	0.050868292	15.9058	16.0942	259.02327
48	Mexico	0.767	28	784	0.588289	21.476	0.62854	0.13846	0.019171172	49.7018	-21.7018	470.96812
49	Montenegro	0.816	45	2025	0.665856	36.72	0.73054	0.08546	0.007303412	54.5724	-9.5724	91.630842
50	Morocco	0.676	43	1849	0.456976	29.068	0.71854	-0.04254	0.001809652	40.6564	2.3436	5.492461
51	Namibia	0.645	53	2809	0.416025	34.185	0.77854	-0.13354	0.017832932	37.575	15.425	237.93063
52	Nepal	0.579	31	961	0.335241	17.949	0.64654	-0.06754	0.004561652	31.0146	-0.0146	0.0002132
53	Netherlands	0.934	82	6724	0.872356	76.588	0.95254	-0.01854	0.000343732	66.3016	15.6984	246.43976
54	New Zealand	0.921	87	7569	0.848241	80.127	0.98254	-0.06154	0.003787172	65.0094	21.9906	483.58649
55	Niger	0.377	34	1156	0.142129	12.818	0.66454	-0.28754	0.082679252	10.9358	23.0642	531.95732
56	Nigeria	0.534	27	729	0.285156	14.418	0.62254	-0.08854	0.007839332	26.5416	0.4584	0.2101306
57	Norway	0.954	84	7056	0.910116	80.136	0.96454	-0.01054	0.000111092	68.2896	15.7104	246.81667
58	Oman	0.834	52	2704	0.695556	43.368	0.77254	0.06146	0.003777332	56.3616	-4.3616	19.023555
59	Pakistan	0.56	33	1089	0.3136	18.48	0.65854	-0.09854	0.009710132	29.126	3.874	15.007876
60	Panama	0.795	37	1369	0.632025	29.415	0.68254	0.11246	0.012647252	52.485	-15.485	239.78523
61	Paraguay	0.724	29	841	0.524176	20.996	0.63454	0.08946	0.008003092	45.4276	-16.4276	269.86604
62	Peru	0.759	35	1225	0.576081	26.565	0.67054	0.08846	0.007825172	48.9066	-13.9066	193.39352
63	Poland	0.872	60	3600	0.760384	52.32	0.82054	0.05146	0.002648132	60.1388	-0.1388	0.0192654
64	Portugal	0.85	64	4096	0.7225	54.4	0.84454	0.00546	0.00002981	57.952	6.048	36.578304
65	Romania	0.816	47	2209	0.665856	38.352	0.74254	0.07346	0.005396372	54.5724	-7.5724	57.341242
66	Russia	0.824	28	784	0.678976	23.072	0.62854	0.19546	0.038204612	55.3676	-27.3676	748.98553
67	Rwanda	0.536	56	3136	0.287296	30.016	0.79654	-0.26054	0.067881092	26.7404	29.2596	856.12419
68	Saint Lucia	0.745	55	3025	0.555025	40.975	0.79054	-0.04554	0.002073892	47.515	7.485	56.025225
69	Saudi Arabia	0.857	49	2401	0.734449	41.993	0.75454	0.10246	0.010498052	58.6478	-9.6478	93.080045

70	Senegal	0.514	45	2025	0.264196	23.13	0.73054	-0.21654	0.046889572	24.5536	20.4464	418.05527
71	Serbia	0.799	39	1521	0.638401	31.161	0.69454	0.10446	0.010911892	52.8826	-13.8826	192.72658
72	Sierra Leone	0.438	30	900	0.191844	13.14	0.64054	-0.20254	0.041022452	16.9992	13.0008	169.0208
73	Singapore	0.935	85	7225	0.874225	79.475	0.97054	-0.03554	0.001263092	66.401	18.599	345.9228
74	Slovakia	0.857	50	2500	0.734449	42.85	0.76054	0.09646	0.009304532	58.6478	-8.6478	74.784445
75	Slovenia	0.902	60	3600	0.813604	54.12	0.82054	0.08146	0.006635732	63.1208	-3.1208	9.7393926
76	Solomon Islands	0.557	44	1936	0.310249	24.508	0.72454	-0.16754	0.028069652	28.8278	15.1722	230.19565
77	South Africa	0.705	43	1849	0.497025	30.315	0.71854	-0.01354	0.000183332	43.539	-0.539	0.290521
78	South Korea	0.906	57	3249	0.820836	51.642	0.80254	0.10346	0.010703972	63.5184	-6.5184	42.489539
79	South Sudan	0.413	13	169	0.170569	5.369	0.53854	-0.12554	0.015760292	14.5142	-1.5142	2.2928016
80	Spain	0.893	58	3364	0.797449	51.794	0.80854	0.08446	0.007133492	62.2262	-4.2262	17.860766
81	Sri Lanka	0.78	38	1444	0.6084	29.64	0.68854	0.09146	0.008364932	50.994	-12.994	168.84404
82	Sudan	0.508	16	256	0.258064	8.128	0.55654	-0.04854	0.002356132	23.9572	-7.9572	63.317032
83	Suriname	0.724	43	1849	0.524176	31.132	0.71854	0.00546	0.00002981	45.4276	-2.4276	5.8932418
84	Sweden	0.937	85	7225	0.877969	79.645	0.97054	-0.03354	0.001124932	66.5998	18.4002	338.56736
85	Switzerland	0.946	85	7225	0.894916	80.41	0.97054	-0.02454	0.000602212	67.4944	17.5056	306.44603
86	Syria	0.549	13	169	0.301401	7.137	0.53854	0.01046	0.000109412	28.0326	-15.0326	225.97906
87	Tanzania	0.528	36	1296	0.278784	19.008	0.67654	-0.14854	0.022064132	25.9452	10.0548	101.099
88	Thailand	0.765	36	1296	0.585225	27.54	0.67654	0.08846	0.007825172	49.503	-13.503	182.33101
89	Togo	0.513	30	900	0.263169	15.39	0.64054	-0.12754	0.016266452	24.4542	5.5458	30.755898
90	Tunisia	0.739	43	1849	0.546121	31.777	0.71854	0.02046	0.000418612	46.9186	-3.9186	15.355426
91	Turkey	0.807	41	1681	0.651249	33.087	0.70654	0.10046	0.010092212	53.6778	-12.6778	160.72661
92	Uganda	0.528	26	676	0.278784	13.728	0.61654	-0.08854	0.007839332	25.9452	0.0548	0.003003
93	United Arab Emirates	0.866	70	4900	0.749956	60.62	0.88054	-0.01454	0.000211412	59.5424	10.4576	109.3614
94	United Kingdom	0.92	80	6400	0.8464	73.6	0.94054	-0.02054	0.000421892	64.91	15.09	227.7081
95	United States of America	0.92	71	5041	0.8464	65.32	0.88654	0.03346	0.001119572	64.91	6.09	37.0881
96	Uruguay	0.808	70	4900	0.652864	56.56	0.88054	-0.07254	0.005262052	53.7772	16.2228	263.17924
97	Vietnam	0.693	33	1089	0.480249	22.869	0.65854	0.03446	0.001187492	42.3462	-9.3462	87.351454

98	Yemen	0.463	14	196	0.214369	6.482	0.54454	-0.08154	0.006648772	19.4842	-5.4842	30.07645
99	Zambia	0.591	35	1225	0.349281	20.685	0.67054	-0.07954	0.006326612	32.2074	2.7926	7.7986148
100	Zimbabwe	0.563	22	484	0.316969	12.386	0.59254	-0.02954	0.000872612	29.4242	-7.4242	55.118746
	Total	74.656	4767	266916	58.119414	3795.921	74.656	-0.000414	0.99159268	4767.0064	-0.0064	16497.354

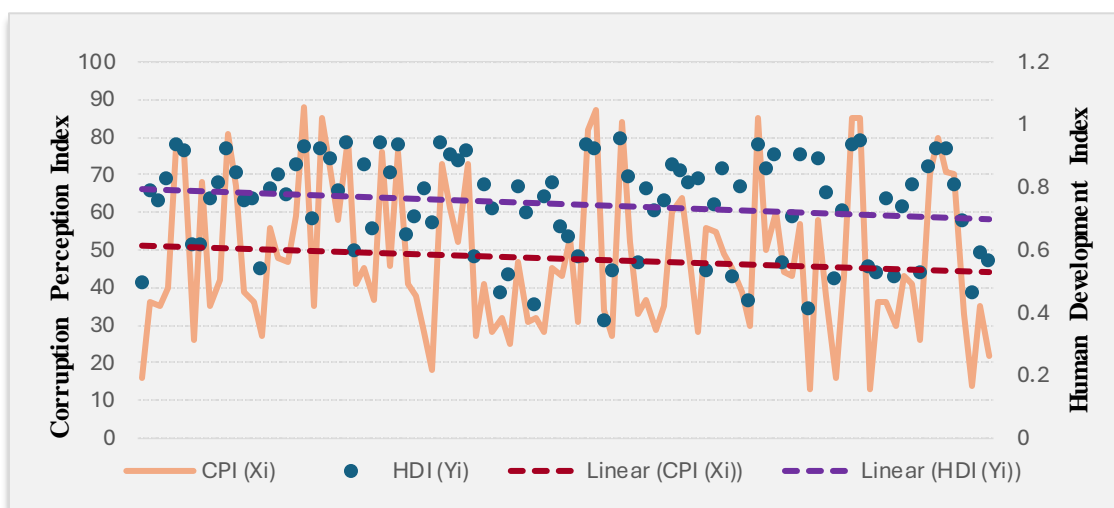


Figure 1: Dual-Axis Scatter Plot with Trend Lines of HDI and CPI

Figure 1 shows the graphical representation of values of CPI and HDI of 100 countries, where the left-side vertical axis denotes CPI and the right-side vertical axis illustrate HDI. The CPI line goes up and down, indicating that the level of perceived corruption varies greatly across the countries. The red dashed line represents the linear trend for the CPI, which is relatively flat, showing a slight decrease over the data points, indicating a small downward trend in perceived corruption. The purple dashed line represents the linear trend for the HDI. This line is also relatively flat, showing a slight increase over the data points indicating a small upward trend in human development. The HDI values are more stable, generally staying in the middle to upper range. The trend lines indicate that while both indices fluctuate, their overall averages are relatively steady.

Statistically Analysis:

The correlation coefficient between two variables, is $r_{xy} = 0.7708$ (approx) which is positive and moderately high, implies that less corruption (higher value of CPI) is positively associated with higher human development. $r^2 = 0.59$, it implies the explanatory variables explain about 59% of the explained variable.

Regressing HDI on CPI

In our model: $Y_i = \beta_1 + \beta_2 X_i + u_i$ (For regression HDI on CPI, we denote $\alpha = \beta_1$ and $\beta = \beta_2$). The regression equation is $\hat{Y}_i = 0.46054 + 0.006X_i$

Test of Hypothesis: Null Hypothesis $H_0: \beta_2 = 0$

Alternative hypothesis $H_1: \beta_2 \neq 0$

Under the normality assumption, the test statistic- ‘t’ follows the t-distribution with (n – 2) degrees of freedom.

$$t = \frac{0.006}{0.000505008} = 11.8809 \text{ (approx)}$$

The critical Region at 5% level of significance is $|t| \geq 1.9739$. Since the calculated t is much greater than the tabulated t , the null hypothesis is rejected, and the alternative hypothesis is accepted. A 10% rise in CPI causes a 6% rise in the HDI.

Goodness of fit of the regression equation

$$r_{xy}^2 = \frac{ESS}{TSS} = \frac{1.428}{2.3} = 0.6208 \text{ (approx)}$$

The coefficient of determination (r_{xy}^2) is 0.6208, means fluctuations in the rate of corruption in a country have been able to explain the fluctuations in human development by 62.08%.

Regressing CPI on HDI:

In our model: $X_i = \beta_3 + \beta_4 Y_i + v_i$ (regression CPI on HDI, we denote $\alpha = \beta_3$ and $\beta = \beta_4$)

Regression equation of CPI on HDI: $\hat{X}_i = -26.538 + 99.4Y_i$

Test of significance:

Null Hypothesis $H_0: \beta_4 = 0$

Alternative hypothesis $H_1: \beta_4 \neq 0$

$$t = \frac{99.4}{8.403126815} = 11.8289 \text{ (approx)}$$

The critical Region at 5% level of significance is $|t| \geq 1.9739$. Calculated t is much greater than tabulated t ; hence the alternative hypothesis is accepted. A 10% rise in HDI causes a 9.9% rise in the CPI.

Goodness of fit of the regression equation

$$r_{yx}^2 = \frac{ESS}{TSS} = \frac{22724.828}{39673} = 0.57280 \text{ (approx)}$$

The coefficient of determination (r_{yx}^2) is 0.5728, which implies fluctuation in human development in a country has been able to explain the fluctuations in the rate of corruption by 57.28%.

Here $r^2 \neq r_{xy}^2 \neq r_{yx}^2$ due to the different parameters, TSS and ESS use for calculating the regression of HDI on CPI (β_1, β_2) and the regression of CPI on HDI (β_3, β_4). And mostly $r_{xy}^2 \neq r_{yx}^2$ due to different disturbance terms mentioned as u and v .

DISCUSSION

The socio-economic conditions of countries are often analysed through indices like the Corruption Perception Index (CPI) and the Human Development Index (HDI). The nonlinear effects of corruption on economic development are examined via regression-tree analysis utilising statistics from 103 countries (1996–2017), and the Solow model's heterogeneity is shown by identifying two different types of nations with comparable development models and illustrating how the impact of traditional growth factors is influenced by levels of corruption (Beyaert, García-Solanes & Lopez-Gomez, 2023). The relationship between unemployment and democracy in evaluating corruption levels in 80 underdeveloped countries between 1990 and 2018 shows that, although democracy has a positive effect on lowering corruption, this impact is hampered by higher rates of unemployment. The result suggests that reducing unemployment is crucial for enhancing corruption prevention

([Oueghlissi & Derbali, 2023](#)). The influence of corruption on the rise of human resources in Sub-Saharan Africa using data from 35 countries (1996–2018), showing that corruption decreases life expectancy, average study duration, and the quality of educational and health amenities ([Bazie, Thiombiano, & Maiga, 2023](#)). Empirical studies using disaggregated data demonstrate the adverse relationship between sustainable development and corruption in sub-Saharan Africa ([Hope, 2024](#)). The robustness analysis found a nonlinear relation between GDP and poverty, highlighting the various manners in which corruption, particularly in developing nations, contributes to poverty ([Castro, 2019](#)). Although corruption's adverse effects often hamper development, especially in 83 developing countries, it may be beneficial in regions like North Africa, the Middle East, and Latin America. Building public institutions and arguing that composite indicators offer an expanded view of the complexity of corruption are crucial ([Spyromitros & Panagiotidis, 2022](#)). A statistical model demonstrates a positive correlation between the Human Development Index (HDI) and the Corruption Perception Index (CPI), indicating the rise of populism in European democracies. Also, a significant link exists between these indicators and the rise of populism, particularly after the financial crisis-induced social dissatisfaction ([Sarabia et al., 2019](#)). Based on data from 48 sub-Saharan African countries between 2012 and 2020, perceptions of corruption are positively associated with a greater Human Capital Index (HCI) and inversely associated with a greater Online Service Index (OSI), while the Telecommunication Infrastructure Index (TII) had no significance ([Paul & Adams, 2023](#)).

Following several prior studies, the current study tries to show a significant association between the Corruption Perception Index (CPI) and the Human Development Index (HDI) by using specific statistical factors. The correlation value of 0.7708 indicates that HDI, which represents greater human development, tends to increase together with CPI, which suggests less corruption. Based on the regression analyses, there is a substantial relationship between the two variables. About 62.08% of the deviation in HDI and 57.28% of the variation in CPI are explained by the models for the regression of HDI on CPI and CPI on HDI, respectively. The statistical relevance of these connections is verified by the hypothesis tests, suggesting that higher CPI (less corruption) leads to higher HDI, and higher HDI promotes less corruption. Overall, the results show a strong correlation between degrees of corruption and human development, with improvements in one leading to considerable progress in the other. This emphasises the importance of anti-corruption initiatives as an approach to boost human development and vice versa.

Despite increased transparency over the past 30 years, perceptions of corruption have remained stagnant. [Transparency International \(2021\)](#) notes that the global average score for corruption perception has remained at 43 out of 100 for the last decade, with two-thirds of countries scoring below 50. However, nations like Mexico, India, Brazil, and Ukraine have made significant strides in increasing public access to demographic, administrative, and judicial data ([Mungiu-Pippidi, 2023](#)). Around the world, countries have improved their scores, proving that development is possible in any circumstance. Western Europe and the European Union (EU) experienced a decline in their average score to 65 out of 100 as political integrity and checks and balances were undermined ([United Nations Development Programme, 2023/2024](#)). With an average score of 35, Eastern Europe and Central Asia struggle with widespread corruption, growing authoritarianism, and an unstable legal system. While some Sub-Saharan African nations have improved, the majority still have low scores. The Middle East and North Africa region's average score of 38 indicates minimal progress, indicating ongoing difficulties with governmental corruption and war. Asia Pacific's average score is a persistently stable 45, while formerly top-scoring nations are regressing. The Americas have an average of 43 percent amnesty rate, which is being made possible by a lack of judicial independence and a weaker rule of law ([Transparency International the global coalition against corruption, 2023](#)).

LIMITATIONS

This study analyses statistics from only 100 different countries to explore the relationship between HDI and CPI using a linear regression model and statistical methods like goodness of fit, hypothesis testing, and correlation

coefficients. Further studies may expand to a larger global dataset with the goal of discovering patterns, recording long-term or regional changes using different models, and studying specific regional or cultural factors affecting corruption and human development.

CONCLUSION

This study highlights a critical link between human development and corruption, demonstrating that higher levels of human development are associated with lower levels of corruption and vice versa across 100 countries. Two regression analyses show that both CPI and HDI influence each other confidently. The results highlight a significant positive link between the Corruption Perception Index (CPI) and the Human Development Index (HDI) and how important it is to eradicate corruption as a complicated issue that affects public infrastructure, political stability, economic equality, and transparency. In order to effectively combat corruption, broad strategies involving institutional, social, and economic improvements are required. Preventing corruption perception may involve better internet services and improved human capacity through training. There should be improvements in the political system and the establishment of the power of democracy to get rid of corruption. To combat corruption in recent years, it is crucial to strengthen institutional frameworks by enhancing transparency and accountability. Additionally, leveraging technology for greater transparency in government and business practices, along with fostering international cooperation, can help address and mitigate corruption on a broader scale. Future studies should look at the long-term, regional patterns between the HDI and CPI, with an emphasis on the effects of corruption on income equality, healthcare, and education. Research on the efficaciousness of anti-corruption measures, like legal reforms and transparency initiatives, may shed light on human development. Along with examining the influence of cultural norms, comparative studies on nations that have successfully or unsuccessfully combated corruption may also be able to provide best practices for promoting integrity and accountability on a global scale.

Conflict Of Interest

The author declares that they have no conflict of interests.

ACKNOWLEDGEMENT

I have heartfelt gratitude to my college, my professors, and the institution for their guidance and direction. Additionally, I am grateful to my family and workplace for their support throughout this journey.

REFERENCES

- Audi, M., & Ali, A. (2017). Exploring the Linkage between corruption and economic development in case of selected developing and developed nations. <https://mpira.ub.uni-muenchen.de/id/eprint/83518>
- Bazie, P., Thiombiano, N., & Maiga, E. W. (2024). Fighting corruption in developing countries to meet the challenge of human capital development: Evidence from Sub-Saharan African countries. *Journal of the Knowledge Economy*, 15(2), 6780-6801. <https://doi.org/10.1007/s13132-023-01330-9>
- Beyaert, A., García-Solanes, J., & Lopez-Gomez, L. (2023). Corruption, quality of institutions and growth. *Applied economic analysis*, 31(91), 55-72. <https://doi.org/10.1108/AEA-11-2021-0297>
- Castro, C. C. (2019). How Corruption Impacts Poverty in Developing Countries? The Role of Education. *Country Economy.com*. (2018). Human Development Index – HDI. [Human Development Index - HDI 2018 | countryeconomy.com](https://www.countryeconomy.com) (Accessed: 29-08-2024)

- Hope, Sr, K. R. (2024). The corruption and sustainable development nexus in Africa: a contemporary review and analysis. *Journal of Financial Crime*, 31(2), 331-346. <https://doi.org/10.1108/JFC-10-2022-0257>
- Linhartova, V., & Pucek, M. J. (2024). Corruption and Human Development: Panel Data Analysis in Transition Economies. *Montenegrin Journal of Economics*, 20(2), 169-182. <https://doi.org/10.14254/1800-5845/2024.20-2.14>
- Montagna, P., & Harris, A. (Eds.). (2019). *Psychoanalysis, Law, and Society*. Routledge. <https://doi.org/10.4324/9780429202438>
- Mungiu-Pippidi, A. (2023). Transparency and corruption: Measuring real transparency by a new index. *Regulation & Governance*, 17(4), 1094-1113. <https://doi.org/10.1111/rego.12502>
- Oueghlissi, R., & Derbali, A. (2023). Democracy, corruption and unemployment: Empirical evidence from developing countries. *Journal of the Knowledge Economy*, 1-22. <https://doi.org/10.1007/s13132-023-01204-0>
- Paul, C., & Adams, S. O. (2023). The effect of e-government development indices (EGDI) on corruption perception index in sub-Sahara Africa: A panel data analysis. *African Journal of Science, Technology, Innovation and Development*, 16(1), 17–25. <https://doi.org/10.1080/20421338.2023.2247904>
- Ruzanov, R. M., & Zharlygassinov, T. M. (2021). Corruption in the healthcare sector during the COVID-19 pandemic: causes, consequences, and responses. *Economics: the Strategy and Practice*, 16(3), 217-226. <https://doi.org/10.51176/1997-9967-2021-3-217-226>
- Sarabia, M., Crecente, F., del Val, M. T., & Giménez, M. (2019). The Human Development Index (HDI) and the Corruption Perception Index (CPI) 2013–2017: analysis of social conflict and populism in Europe. *Economic Research-Ekonomska Istraživanja*, 33(1), 2943–2955. <https://doi.org/10.1080/1331677X.2019.1697721>
- Spyromitros, E., & Panagiotidis, M. (2022). The impact of corruption on economic growth in developing countries and a comparative analysis of corruption measurement indicators. *Cogent Economics & Finance*, 10(1). <https://doi.org/10.1080/23322039.2022.2129368>
- Tawiah, V., Zakari, A., & Alvarado, R. (2024). Effect of corruption on green growth. *Environment, Development and Sustainability*, 26(4), 10429-10459. <https://doi.org/10.1007/s10668-023-03152-w>
- Trabelsi, M. A. (2024). The impact of corruption on economic growth: a nonlinear evidence. *Journal of Social and Economic Development*, 1-10. <https://doi.org/10.1007/s40847-023-00301-9>
- Transparency International the global coalition against corruption. (2018). *Corruption Perceptions Index*. <https://www.transparency.org/en/cpi/2018> (Accessed: 29-08-2024)
- Transparency International the global coalition against corruption. (2023). *Corruption Perceptions Index 2023*. <https://images.transparencycdn.org/images/CPI-2023-Report.pdf> (Accessed: 29-08-2024)
- United Nations Development Programme. (2024, March 14). *Human Development Report 2023-24*. <https://www.undp.org/india/publications/human-development-report-2023-24-0> (Accessed: 29-08-2024)
- Zhang, M., Zhang, H., Zhang, L., Peng, X., Zhu, J., Liu, D., & You, S. (2023). Corruption, anti-corruption, and economic development. *Humanities and Social Sciences Communications*, 10(1), 1-13. <https://doi.org/10.1057/s41599-023-01930-5>